

Appln No.: 10/605,671
Amendment Dated: November 29, 2007
Reply to Office Action of September 14, 2007

Remarks/Arguments Against the Present Rejections:

Claims 72-78, 80, 83-88, 91-97, 100, 102-107, 110-112, 114-116, 118-124, 127-130, and 132 are rejected under 103 (a) as obvious over Okumura et al. (US 5,451,632).

Independent claims 72, 119, and 132 and dependent claims based thereon are not obvious

Independent claims 72, 119, and 132 and dependent claims based thereon include the limitations, *inter alia*, that the composition is a three-component composition comprising:

- (a) a bulk resin component comprising a polycarbonate resin;
- (b) a polycarbonate-siloxane copolymer in an amount sufficient to provide an amount of siloxane of at least 3% by weight of the total composition; and
- (c) a colorant composition comprising titanium dioxide having an organic coating, wherein the amount of titanium dioxide is from 1 to 2.5 % by weight of the total composition.

The inventors have found that the addition of polycarbonate-siloxane copolymer to titanium dioxide / polycarbonate compositions **reduces** the flame retardant properties of the **3-component** composition when TiO₂ without an **organic coating** is employed and when the component amounts are **outside** of the claimed limits. *See* paragraphs 21 and 22 of the present application.

The reduction in fire retardant properties is illustrated in the example section of the present application. *See* Example 1 (Table 3). It can be seen that in compositions 1-11 containing TiO₂, polycarbonate, and PC-PDMS copolymer (2.4% siloxane), none of the compositions had a reasonable expectation of meeting the V0 flame test standard. Okumura discloses that PC-PDMS copolymer has superior flame retardant properties to PC and that TiO₂,

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when added to PC or PC-PDMS (but not the combination of all three) does not reduce flame retardance. Thus, the herein observed properties of the three-component mixture are contrary to the observations reported in Okumura. *See* paragraph 21 of the present application.

The Examiner indicates that the present specification "does not fully illustrate that a lowered degree of flame retardance in a composition containing all of a polycarbonate, polycarbonate, polysiloxane copolymer, and TiO_2 is unexpected". *See* page 7 last paragraph of the present office action. The Examiner indicates that the present disclosure is missing examples showing TiO_2 and the PC-polysiloxane copolymer exclusive of polycarbonate. *Id.* However, the Examiner's own reference, Okumura, illustrates that compositions of TiO_2 and the PC-polysiloxane copolymer exclusive of polycarbonate achieve V-O ratings. *See* tables 1D and 2D Okumura. Furthermore the Examiner's own reference, Okumura, illustrates that compositions of the PC-polysiloxane copolymer and PC exclusive of TiO_2 , also achieve V-O ratings. *See* tables 1B and 2B of Okumura. Further, the Examiner and Applicants agree that, "it is unexpected that a composition containing all three [the siloxane copolymer, the polycarbonate, and the TiO_2] would not exhibit comparable flame retardance . . .". *See* the paragraph spanning pages 7 and 8 of the present office action.

The present application claims the solution to the above-observed and unexpected problem. Claims 72, 119, and 132 are specific for a **three-component** composition comprising a specific combination of its three components ((1) an organic coated TiO_2 , (2) polycarbonate, and (3) polycarbonate-polysiloxane copolymer). The combination of these components, in the amount specified in the claims, **increases** the flame performance of molded articles made from the **three-component** composition.

The organic coating is important. The amount of individual components are important.

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The combination of the organic coating and the amount of individual components as claimed by the present claims are important and are not anticipated or rendered obvious by Okumura.

The Examiner maintains that the present limitations are obvious because Okumura discloses three-component compositions and therefore must disclose the compositions and articles of the present invention. The basis for maintaining the present rejection to the claims is **based on the cursory mention** in Okumura of polysiloxane-polycarbonate and various embodiments of component (B). This reasoning is still flawed. Okumura at column 15 lines 40-44 reads,

The molded articles of PC-PDMS copolymer is also obtained by preparing a resin composition by using PC-PDMS as the component (A) and various kinds of resin, inorganic filler **or** pigment as the component (B) and then molding the resin composition.

The Examiner maintains that the term **or** as it is used in column 15 line 43 means that molded articles can have PC-PDMS component (A) with any combination of two materials selected from materials (B) (i.e. resin, inorganic filler, and pigment) to provide the three-component compositions of the present invention. The Examiner's reading of the cited section is inconsistent with the balance of Okumura. Nowhere can one find any mention of a **three-component** mixture having a polycarbonate-polysiloxane copolymer, titanium dioxide having an organic coating, and polycarbonate.

In the example section of Okumura, one cannot even find the **three-component** mixture, let alone the **three-component** mixture of the material with an organic coated TiO₂ in the amounts specified by the claims of the present application. Again, the only mention of using a pigment in the examples of Okumura comes in examples 1D to 22D found in Table 1D starting at column 30. These examples illustrate only **two-component** compositions of (1) PC-PDMS

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and (2) a pigment. The comparative examples found in this section illustrate only **two-component** compositions having (1) a polycarbonate resin and (2) a pigment. These **two-component** mixtures do not disclose nor do they suggest a **three-component** mixture. Furthermore no mention is made in the examples of Okumura regarding whether or not the TiO₂ is coated and if so what type of coating is applied.

Applicants submit, and the Examiner agrees, that the results of the present invention ARE IN FACT unexpected **and that this is all that is required to overcome the 103 rejections** of the present claims. Okumura fails to recognize the problems associated with mixtures of the three components. Furthermore, Okumura fails to provide a suggestion of the three-component mixture as required by the present claims. Therefore, Okumura fails to provide a reference that renders the claims of the present application obvious.

Independent claim 102 and dependent claims based thereon are not obvious:

The Examiner rejects independent claim 102 and dependent claims based thereon under 103 (a) as obvious over Okumura (US 5,451,632). Independent claim 102 reads:

102. An article, having a wall thickness greater than a first thickness, said article being formed from a molding composition comprising:

(a) a bulk resin component comprising a polycarbonate resin;

(b) a polycarbonate-siloxane copolymer; and

(c) a colorant composition comprising titanium dioxide, wherein the titanium dioxide has an organic coating, and the amount of polycarbonate-siloxane copolymer is selected such that molding composition achieves a V0 UL fire rating at the first thickness.

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The present claim and dependent claims claim a solution to the presently recognized problem of adding a polycarbonate-polysiloxane copolymer to a composition of polycarbonate and titanium dioxide. As detailed herein and throughout the specification, polycarbonate-polysiloxane copolymer, when added to a polycarbonate containing titanium dioxide, **reduces** the flame retardant properties of articles made from the three-component mixture.

Okumura's disclosure does not recognize, arrive at, nor remotely suggest the presently recognized problem associated with adding a PC-siloxane copolymer to a mixture of titanium dioxide and PC. Further, Okumura does not suggest nor does it disclose the amounts of these three components required for an article formed a composition of the same **to achieve a V0 UL fire rating at its first thickness** as required by claim 102 and the rest of the rejected claims dependent thereon.

The limitation relating to the composition achieving a **VO UL fire rating at the articles' first thickness** is important. *See* paragraph [0053] of the specification. In assessing flame-retardance of an article it is particularly relevant to consider the point of minimum wall thickness, since this is the region of the article that is most flammable. *Id.* In the present claims, the minimum wall thickness of the article is referred to as the "first thickness" and the amount of polycarbonate-siloxane copolymer in the composition is selected such that a VO UL fire rating of the composition is achieved at this minimum thickness. *Id.*

The desired amount of polycarbonate-siloxane copolymer depends on the minimum thickness of the article, the amount of polycarbonate, the amount of the titanium dioxide, and the type of coating applied to the titanium dioxide. For example, Tables 4 and 5 of the present application show the results when the amount of copolymer is increased, using an **organic coated** TiO₂. As shown in examples 13 and 20, adequate performance can be achieved using

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either lower amounts of **organic coated** TiO₂ or higher amounts of siloxane (4%). Example 3 uses copolymers containing 18% copolymer (3.6% siloxane) or 17.8% copolymer (3.56% siloxane) and two types of **organic coated** TiO₂. These samples are within the scope of the present invention and consistently achieved over or near 90% likelihood of passing the V0 test. Exemplary amounts of polycarbonate-siloxane copolymer relative to the wall thickness and titanium dioxide are also given in paragraph [0053] of the specification.

Again, there is no teaching in Okumura of the claimed three-component mixture nor any teaching directed to the amounts of each of the three-components that is required to achieve a VO UL fire rating of an article at its minimum thickness. Therefore, Okumura fails to provide a reference that renders these claims obvious.

Rejected dependant claims 73, 103, and 120 and dependent claims based thereon (i.e. claims 74-101, 104-118, and 121-131) state that "the bulk resin component makes up at least 50% of the composition" and are likewise not obvious:

As stated above there is no teaching in Okumura of the claimed three-component mixture nor the claimed three-component mixture in the amounts as required in by the claims. Claims 73, 103, and 120 and therefore dependent claims 74-101, 104-118, and 121-131 require that the bulk resin be at least 50% of the composition. This means that necessarily the amount of polycarbonate-siloxane copolymer is less than 50%. The PC-siloxane copolymer, used as a starting material for mixing with PC in the example section of Okumura, with the highest amount of siloxane is in example 2A (i.e. 3.8% PDMS). If this PC-siloxane copolymer were used in a composition containing 50% bulk resin and 50% copolymer, the amount of siloxane would be 1.9% which is outside the scope of the present claims.

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Claims 79, 101, and 131 are rejected under 103 (a) as obvious over Okumura et al. (US 5,451,632) in view of Lo et al. (US 5,804,654) and/or Falcone (US Patent Application Publication no. 2002/0019466).

As stated above, on March 1, 2006 the Examiner issued an office action withdrawing his October 18, 2005 indication of allowable subject matter. He instead rejected these claims, inter alia, as obvious over Okumura in view of Lo and Falcone. Lo and Falcone were cited for providing the previously-deemed-allowable limitations related to the anti-drip agent. Applicants resubmit all arguments outlined above with respect to the shortcomings of Okumura and incorporate them into this section by reference thereto.

The Lo and Falcone references cited by the Examiner fail to plug the holes of Okumura:

The secondary references cited by the Examiner (i.e. Lo and Falcone) were cited with respect to disclosing only the previously-deemed-allowable anti-drip limitations. The secondary references fail to provide the above-mentioned deficiencies of Okumura. Therefore, the obviousness rejections to independent claims 72 and 102 and to dependent claims based thereon should be withdrawn.

Claims 94-96, 98-99, 113-115, and 117-118 are now rejected under 103 (a) as obvious over Okumura et al. (US 5,451,632) in view of new references Brand (US 4,357,170) and/or Nelson (US 3,542,575).

As stated above, in the present office action, the Examiner withdraws his indication that a rubbery impact modifier and the specific organic coating would present allowable limitations to the claims. The Examiner now rejects claims 94-96, 98-99, 113-115, and 117-118 as obvious over the combination of Okumura in view of new secondary references. Brand and Nelson are only cited for providing the previously-deemed-allowable limitations related to the dispersing agent. Applicants resubmit all arguments outlined above with respect to the shortcomings of Okumura and incorporate them into this section by reference thereto.

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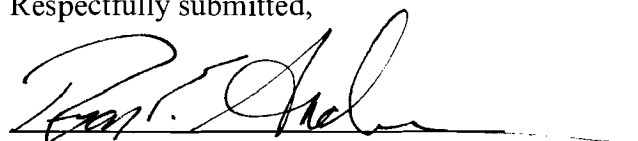
The Brand and Nelson references cited by the Examiner fail to plug the holes of Okumura:

The secondary references cited by the Examiner (i.e. Brand and Nelson) were cited with respect to disclosing only the previously-deemed-allowable dispersing agent limitations. The secondary references fail to provide the above-mentioned deficiencies of Okumura. Therefore, the obviousness rejections to these claims should be withdrawn.

Conclusion

For all of the foregoing reasons, Applicants submit that the 103 (a) rejections should be withdrawn and that all claims (i.e. 72-132) of this application are in form for allowance. Such action is earnestly solicited.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Marina T. Larson', is written over a horizontal line.

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